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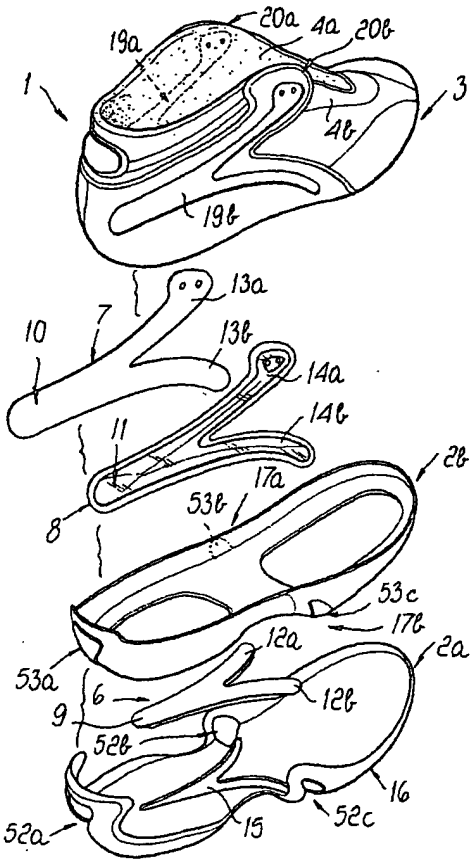
[Continued on next page]

(54) Title: SPORTS SHOE



(57) Abstract: A sports shoe, comprising a sole associated with an upper (3), the upper having a first flap (4a) and a second flap (4b) which cooperate with fastening means (5c), three distinct stabilizer elements (6, 7, 8) being associated with the sole and the upper and interacting with at least one element for connecting at least one of their ends.

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SPORTS SHOE

Technical Field

The present invention relates to a sports shoe, particularly a tennis shoe.

Background Art

Conventional sports shoe are constituted by a sole associated with an upper having two flaps that can be joined by fastening means, usually constituted by a lace, guided through holes formed in the flaps.

Conventional shoes are sometimes provided with a mid-sole, made of elastically compressible material, which is arranged between the sole and the upper so as to cushion impacts or vibrations and thus increase user comfort.

The main drawback of such conventional sports shoes, particularly noticeable in the practice of sports such as tennis or squash, is that they do not offer sufficient support for the foot during sudden changes in direction, entailing possible ankle sprains.

Particularly during lateral movements, which are very frequent in the above cited sports, such shoes offer poor stability, because the upper, usually made of soft material so as to offer adequate comfort to the user, does not provide sufficient support with respect to the pressure applied by the foot to the lateral part of the upper.

Accordingly, conventional sports shoes have the evident disadvantage of providing the athlete, during direction changes, with a reactivity which is poor and worsens as the suddenness of the direction changes increases.

For the same reason, another drawback of conventional shoes is that they offer the user less safety as regards protection from ankle sprains during sports practice.

US-5,647,145 partially solves the problems linked to foot support in a shoe and discloses a sculpted sole for use in sports shoes, particularly for athletics.

Said sculpted sole is constituted by a base made of elastically

compressible material and has an upper face, a lower face, a front edge and a rear edge.

At the lower face of the sole, proximate to the front edge, there are multiple pads which are arranged so that each pad lies under a single toe of the user's foot, which rests on the upper face of the sole.

To the rear of the pads, along the lower face of the sole, there are supporting elements which are arranged so as to correspond to the position of the metatarsus.

The pads and supporting elements have grooves, recesses and channels so that they are shaped complementarily to the toes and metatarsus, respectively, of the foot, which rests on the sole.

To the rear of the supporting elements, at the heel region, there are flexible plates, made of non-elastic material, which are associated with the heel of the sole in an upper region.

An intermediate element is provided between the supporting elements and the flexible plates, is approximately X-shaped and is made of elastically compressible material. The intermediate element increases the stability and cushions the impacts against the ground, facilitating the flexing motion of the sole.

Although the above prior art shoe improves the performance provided during running, as regards support of the sole of the foot, it does provide lateral containment, because said containment is still entrusted solely to the upper, and it does not facilitate lateral movements or increase their safety; moreover, it is quite complicated and expensive to produce.

US-5,692,319 discloses a shoe constituted by a sole, by an upper provided with sides and by a fastening element which overlaps the upper and has a plurality of closure protrusions.

The fastening element lies along both sides of the upper and is connected under the sole.

Each of the closure protrusions comprises a slotted hole which is suitable

for the passage of a lace for mutual connection of the opposite closure protrusions on the two sides of the upper, so as to ensure the fastening of the upper around the user's foot.

The fastening element can be rigidly coupled externally to the sole or upper or can be removably associated.

Such shoe provides a good fastening of the upper around the foot; as regards stabilization of the foot during sports practice, and particularly during lateral movements, it affects only the ankle region and the pre-arch region, without providing a uniform supporting function, for example in the forefoot region.

Another drawback is that dirt, such as soil, grass or pebbles, can easily accumulate in such shoe at the gaps that may form, during walking, between the fastening element and the upper. That drawback is worsened by the very shape of the fastening element, which comprises many grooves and slotted holes.

Moreover, the difference in rigidity among the materials that constitute the fastening element, which is preferably rigid, and the upper, which is soft, can lead to tearing of the upper at the regions of contact with the edges of the fastening element.

Finally, the use of such shoe can lead to tearing of the fastening element at its part that lies below the sole, which can be damaged during contact with bumps or obstacles which protrude from the ground.

EP-A-0748596 discloses an ankle supporting device which can be used particularly for sports shoes comprising an upper or an innerboot provided with padding and a sole.

That device is constituted by a structural element which comprises a counter which affects the heel and plantar arch regions and from which at least one tab protrudes which can be associated with the upper or innerboot and affects the lateral and/or rear regions of the foot.

Such shoe, which comprises the above described supporting device, is

suitable to support and protect the ankle, avoiding sprains or other movements which are dangerous for the ankle.

However, that shoe is too rigid for practicing sports such as tennis, which require high reactivity and a freedom of movement of the foot which the device inevitably restricts.

Moreover, that device does not perform an effective stabilization of the entire foot, because it affects only the ankle and malleolar region and comprises at the most part of the plantar arch.

Disclosure of the Invention

The aim of the present invention is therefore to solve the noted technical problems, eliminating the drawbacks of the cited known art and thus providing a sports shoe which provides the user with optimum foot stability during direction changes and particularly during lateral movements.

Within the scope of this aim, an important object is to provide a sports shoe which provides adequate support with respect to the pressure applied by the foot to the lateral part of said upper without thereby reducing the comfort offered by the shoe.

Another important object is to provide a sports shoe which allows the athlete to have high reactivity in direction changes.

Another important object is to provide the user with high safety, giving maximum protection against ankle sprains which can occur during sports practice.

Another object is to provide a sports shoe which is structurally simple and has low manufacturing costs.

This aim and these and other objects which will become better apparent hereinafter are achieved by a sports shoe comprising a sole associated with an upper, said upper having a first flap and a second flap which cooperate with fastening means, characterized in that three distinct stabilizer elements are associated with said sole and said upper and interact with at least one element for connecting at least one of their ends.

Brief Description of the Drawings

Further characteristics and advantages of the invention will become better apparent from the following detailed description of a particular embodiment thereof, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a rear perspective view of the sports shoe according to the invention;

Figure 2 is a side view of the shoe;

Figure 3 is a bottom view of the shoe;

Figure 4 is a front cross-section view of the shoe;

Figure 5 is an exploded perspective view of the shoe.

Ways of carrying out the Invention

With reference to the figures, the numeral 1 designates a sports shoe, which comprises a sole 2a which is associated with a mid-sole 2b with which an upper 3 is associated.

The upper 3 has a first flap 4a and a second flap 4b that cooperate with a fastening means, constituted for example by a lace 50 which is guided in holes or eyelets 5.

A first stabilizer element 6, a second stabilizer element 7 and a third stabilizer element 8 are associated with the sole 2a and with the upper 3. The stabilizer elements are all variously Y-shaped so as to have a first arm 9, a second arm 10 and a third arm 11 that are rigidly coupled to respective first, second and third pairs of wings, designated by the reference numerals 12a and 12b, 13a and 13b, and 14a and 14b, respectively.

The first, second and third stabilizer elements are preferably made of partially rigid plastic material.

The first stabilizer element 6 is arranged between the sole 2a and the mid-sole 2b at a complementarily shaped first seat 15 which is formed in the sole 2a along the region of the sole of the foot.

The first stabilizer element 6 is arranged so that the free ends of the first

pair of wings 12a and 12b reach the perimetric edge 16 of the sole 2, preferably at a first region 17a and at a second region 17b.

The first and second regions 17a and 17b can be located, for example, proximate to the region between the plantar arch and the metatarsus.

The end of the first arm 9 of the first stabilizer element 6 is arranged so as to affect a heel region 18.

The second and third stabilizer elements 7 and 8 are arranged externally with respect to the two sides of said upper 2 and partially wrap around the instep at optional second and third complementarily shaped seats 19a and 19b, and are orientated so that the ends of the respective second and third arms 10 and 11 are directed toward the heel. The ends can be connected to the first arm 9 and to each other at the heel region 18.

The second and third pairs of wings 13a and 13b, 14a and 14b of the second and third stabilizer elements 7 and 8 are therefore arranged so that the wings 13a and 14a, also referenced respectively as first and second upper wings, lie above the wings 13b and 14b, also referenced respectively as first and second lower wings. The wings 13a and 14a are therefore arranged proximate to the ends 20a and 20b, of the first and second flaps 4a and 4b.

The free ends of the wings 13b and 14b of the second and third pairs of wings are arranged at the first and second regions 17a and 17b, so as to be able to optionally connect to the free ends of the first pair of wings 12a and 12b, optionally by virtue of an intermediate element.

In this embodiment, the first, second and third stabilizer elements 6, 7 and 8 are not directly connected to each other, but in the region of the heel 18 and in the first and second regions 17a and 17b, respectively, there are first, second and third connecting elements 21a, 21b and 21c, arranged within complementarily shaped seats formed in the sole 2a and in the mid-sole 2b.

At the first, second and third connecting elements 21a, 21b and 21c there

are, in the sole 2a, respectively first, second and third openings 52a, 52b and 52c for respective complementarily shaped first, second and third transparent elements 53a, 53b and 53c.

The first, second and third connecting elements 21a, 21b and 21c, preferably made of composite material, are connected to the respective free ends of the first, second and third stabilizer elements 6, 7 and 8.

In particular, the first connecting element 21a is associated with each of the first, second and third arms 9, 10 and 11. The second connecting element 21b is associated with the wings 13b and 12a, which respectively belong to the second and first stabilizer elements 7 and 6. The third connecting element 21c is connected to the wings 14b and 12b, which respectively belong to the third and first stabilizer elements 8 and 6.

Said connections can be provided by any method well known in the art, for example by gluing or by sewing or melting, directly during molding.

The connection between the second and third stabilizer elements 7 and 8 and the upper 3 also can be provided in various manners: Figure 4 illustrates a connection provided by stitched seams 51.

At the upper ends 20a and 20b of the first and second flaps 4a and 4b there are arranged engagement or sliding means, respectively designated by the reference numerals 22a and 22b, which are constituted by a pair of eyelets which allow the mutual fastening of the free ends of the wings 13a and 14a of the second and third pairs of wings.

The operation of the shoe is as follows: with reference to the above cited figures, the shoe 1 has a configuration which forms, around the user's foot, a sort of cage for supporting and containing the foot.

Said cage is constituted in a lower region by the first stabilizer element 6, laterally by the second and third stabilizer elements 7 and 8, and at the front by the closure lace 50 which passes between the pair of eyelets 22a and 22b.

This produces a sort of supporting frame which surrounds the foot from the region to the rear of the heel along the plantar arch up to the metatarsus

and around the malleoli until it surrounds the instep.

It has thus been observed that the invention has achieved the intended aim and objects, a sports shoe having been devised which offers the user optimum stability of the foot during changes of direction, particularly during lateral movements.

The shoe according to the invention also performs an optimum action for withstanding the pressure applied by the foot to the lateral part of said upper without reducing the comfort offered by said shoe.

The shoe according to the invention is susceptible of numerous modifications and variations, within the scope of the appended claims.

Thus, for example, according to a further embodiment, the first, second and third stabilizer elements are directly associated with each other at their respective free ends, without providing any connecting element, or providing only a partial use thereof, for example by means of the connecting element 21a alone, arranged at the heel region 18.

The materials used, as well as the dimensions of the individual components of the invention, may of course be the most pertinent according to specific requirements.

The disclosures in Italian Patent Application No. TV2000A000085 from which this application claims priority are incorporated herein by reference.

CLAIMS

1. A sports shoe comprising a sole associated with an upper, said upper having a first flap and a second flap which cooperate with fastening means, characterized in that three distinct stabilizer elements are associated with said sole and said upper and interact with at least one element for connecting at least one of their ends.

2. The shoe according to claim 1, characterized in that said stabilizer elements are Y-shaped, each element having an arm which is rigidly coupled to a pair of diverging wings.

3. The shoe according to claim 1, characterized in that it has a first stabilizer element, constituted by a first arm which is rigidly coupled to a first pair of wings and is arranged above said sole.

4. The shoe according to claim 3, wherein a complementarily shaped mid-sole is associated above said sole, characterized in that said first stabilizer element is arranged between said sole and said mid-sole, at a complementarily shaped first seat formed in an upper region in said sole or in a lower region in said mid-sole, along the region of the sole of the foot.

5. The shoe according to claim 3, characterized in that the end of said first arm of said first stabilizer element affects the heel region.

6. The shoe according to claim 3, characterized in that said first stabilizer element is arranged so that each one of the free ends of said first pair of wings reaches one of the lateral perimetric edges of said sole, at a first region and a second region which are arranged at the region between the plantar arch and the metatarsus.

7. The shoe according to claim 1, characterized in that it has a second stabilizer element and a third stabilizer element, constituted respectively by a second arm and a third arm which are rigidly coupled to a second pair of wings and a third pair of wings, which are arranged at the two sides of said upper.

8. The shoe according to claim 7, characterized in that said second and

third stabilizer elements are arranged externally with respect to the two sides of said upper, partially surrounding the instep, and are orientated so that the ends of said second and third arms are directed toward the heel.

9. The shoe according to claim 7, characterized in that said second and third stabilizer elements are arranged at second and third complementarily shaped seats formed in said upper.

10. The shoe according to one or more of the preceding claims, characterized in that each one of said second and third pairs of wings of said second and third stabilizer elements is arranged obliquely or approximately vertically, so as to form first and second upper wings and first and second lower wings.

11. The shoe according to claim 10, characterized in that said first and second upper wings of said second and third pairs of wings are arranged proximate to the ends of said first and second flaps.

12. The shoe according to claim 10, characterized in that each of the free ends of said first and second lower wings of said second and third pairs of wings is arranged at one of the lateral perimetric edges of said sole, at first and second regions which are arranged at the region between the plantar arch and the metatarsus.

13. The shoe according to claims 6 and 12, characterized in that it has, at said heel region and at said first and second regions, respectively a first connecting element, a second connecting element and a third connecting element which are arranged within complementarily shaped seats formed in said sole and/or said mid-sole.

14. The shoe according to claim 13, characterized in that said first, second and third connecting elements act as intermediate elements for the mutual connection of the respective free ends of said first, second and third stabilizer elements.

15. The shoe according to claim 14, characterized in that said first connecting element is associated with each one of said first, second and

third arms.

16. The shoe according to claim 14, characterized in that said second connecting element is associated with said first lower wing of said second pair of wings of said second stabilizer element and with one of said first pair of wings of said first stabilizer element.

17. The shoe according to claim 14, characterized in that said third connecting element is associated with said second lower wing of said third pair of wings of said third stabilizer element and with one of said first pair of wings of said first stabilizer element.

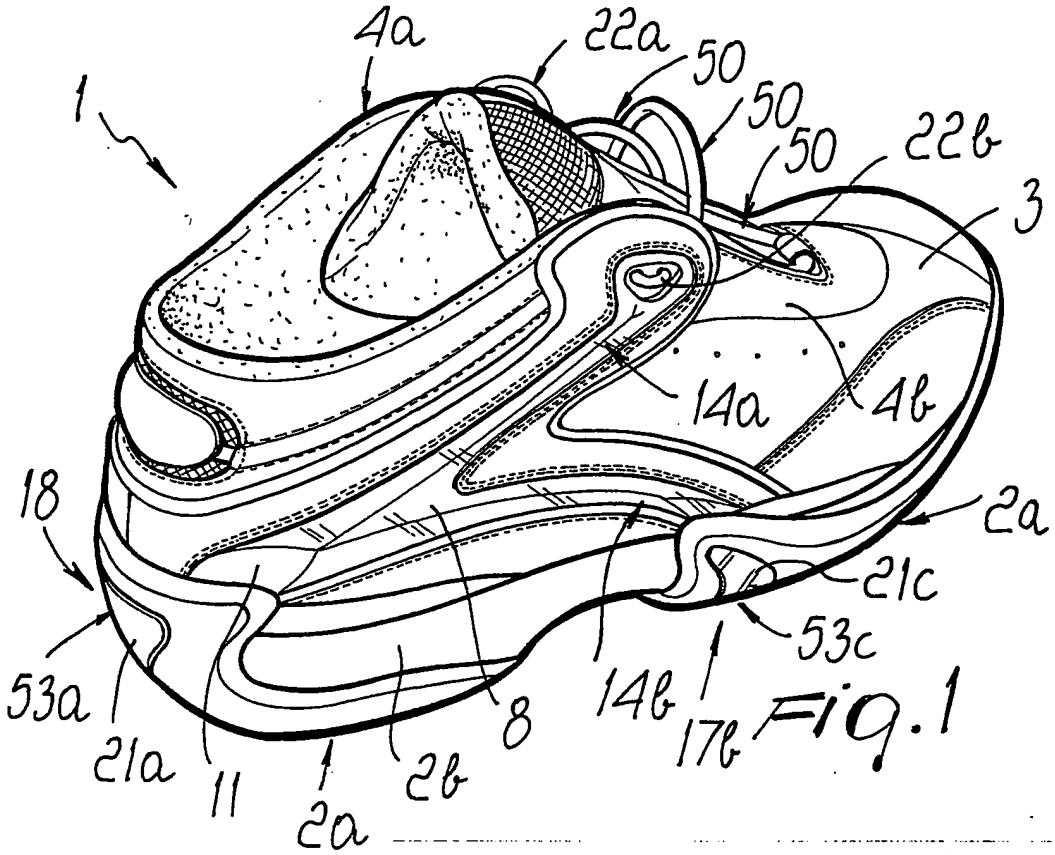
18. The shoe according to one or more of the preceding claims, wherein said fastening means comprises a lace which is guided through holes, characterized in that, at said upper ends of said first and second flaps, there are engagement or sliding means, constituted by a pair of eyelets, which can be associated with said lace so as to allow to mutually fasten the free ends of said first and second upper wings of said second and third pair of wings.

19. The shoe according to one or more of the preceding claims, characterized in that said first, second and third stabilizer elements are directly associated with each other at their respective free ends.

20. The shoe according to one or more of the preceding claims, characterized in that said first, second and third stabilizer elements are directly associated with each other at one or more free ends, using only said first connecting element arranged at the heel region.

21. The shoe according to one or more of the preceding claims, characterized in that said first, second and third stabilizer elements are made of partially rigid plastics.

22. The shoe according to one or more of the preceding claims, characterized in that said first, second and third connecting elements are made of composite material.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22a
50
50
50
22b
3
1
14a
4b
18
2a
21c
53c
53a
14b
17b
8
21a
11
2b
2a

Fig. 1

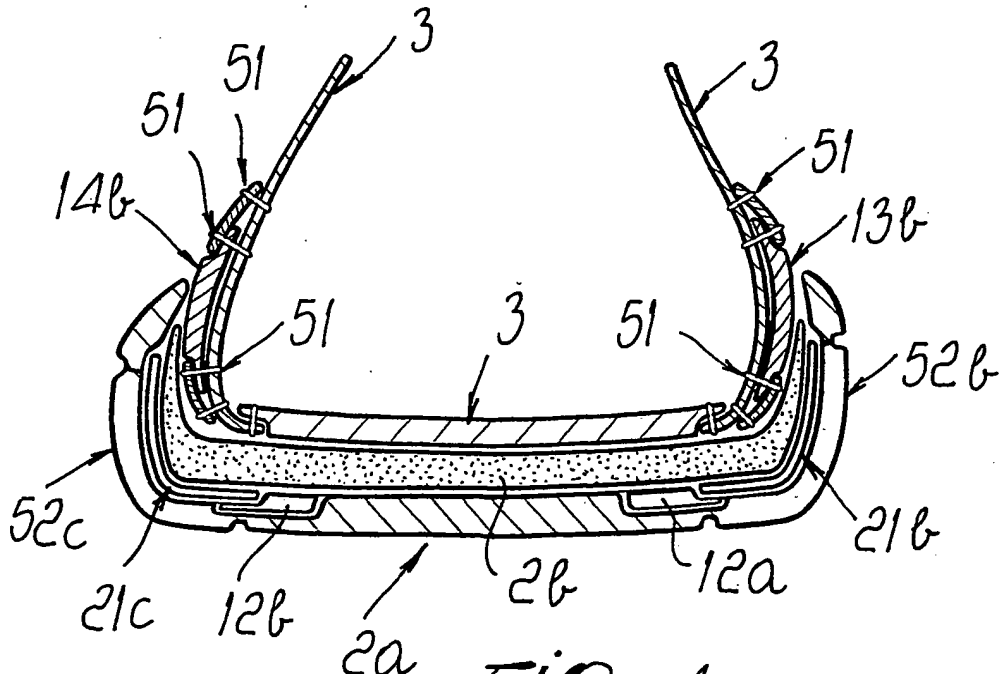
3
51
51
14b
51
3
51
3
51
13b
52b
52c
21c
12b
2a
2b
12a
21b

Fig. 4

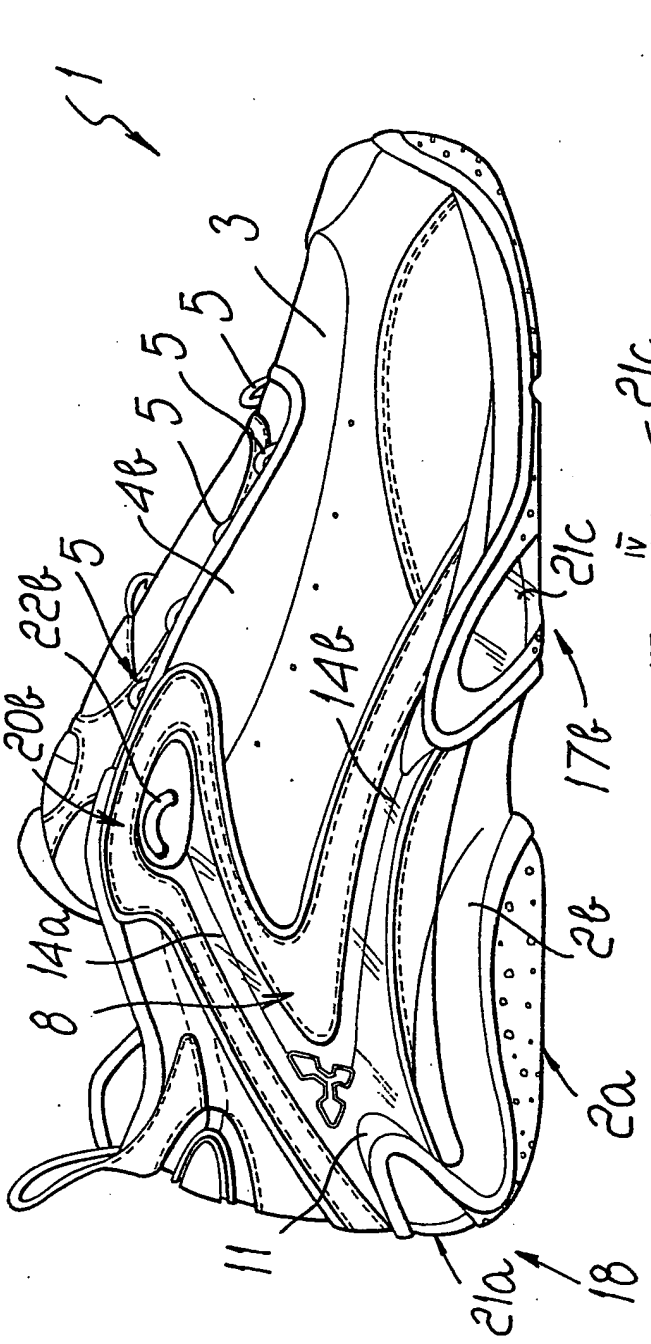

Fig. 2

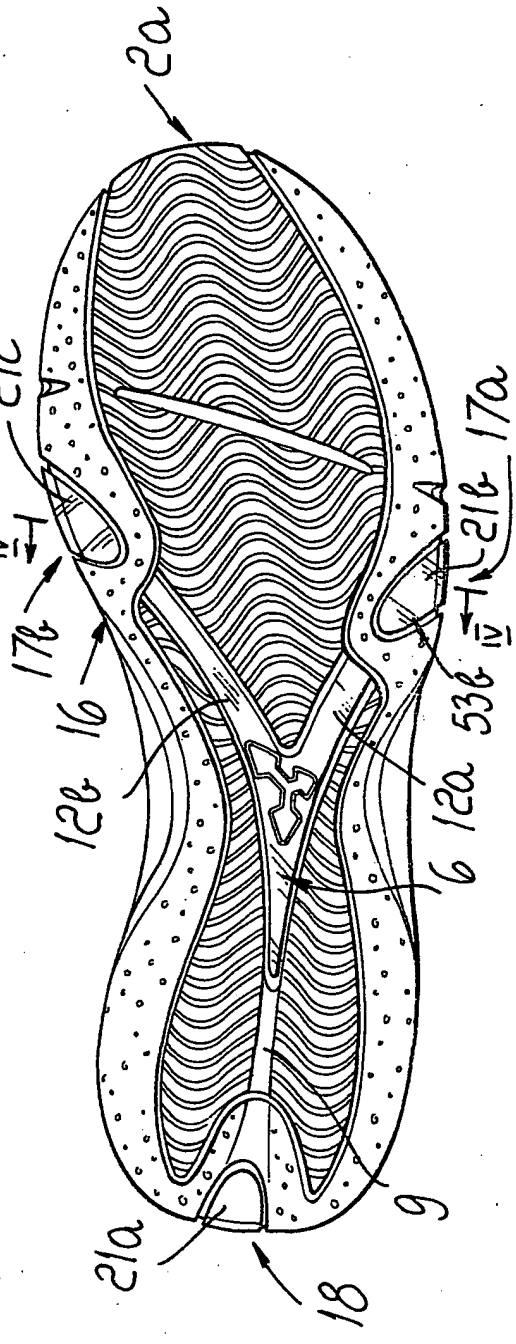

Fig. 3

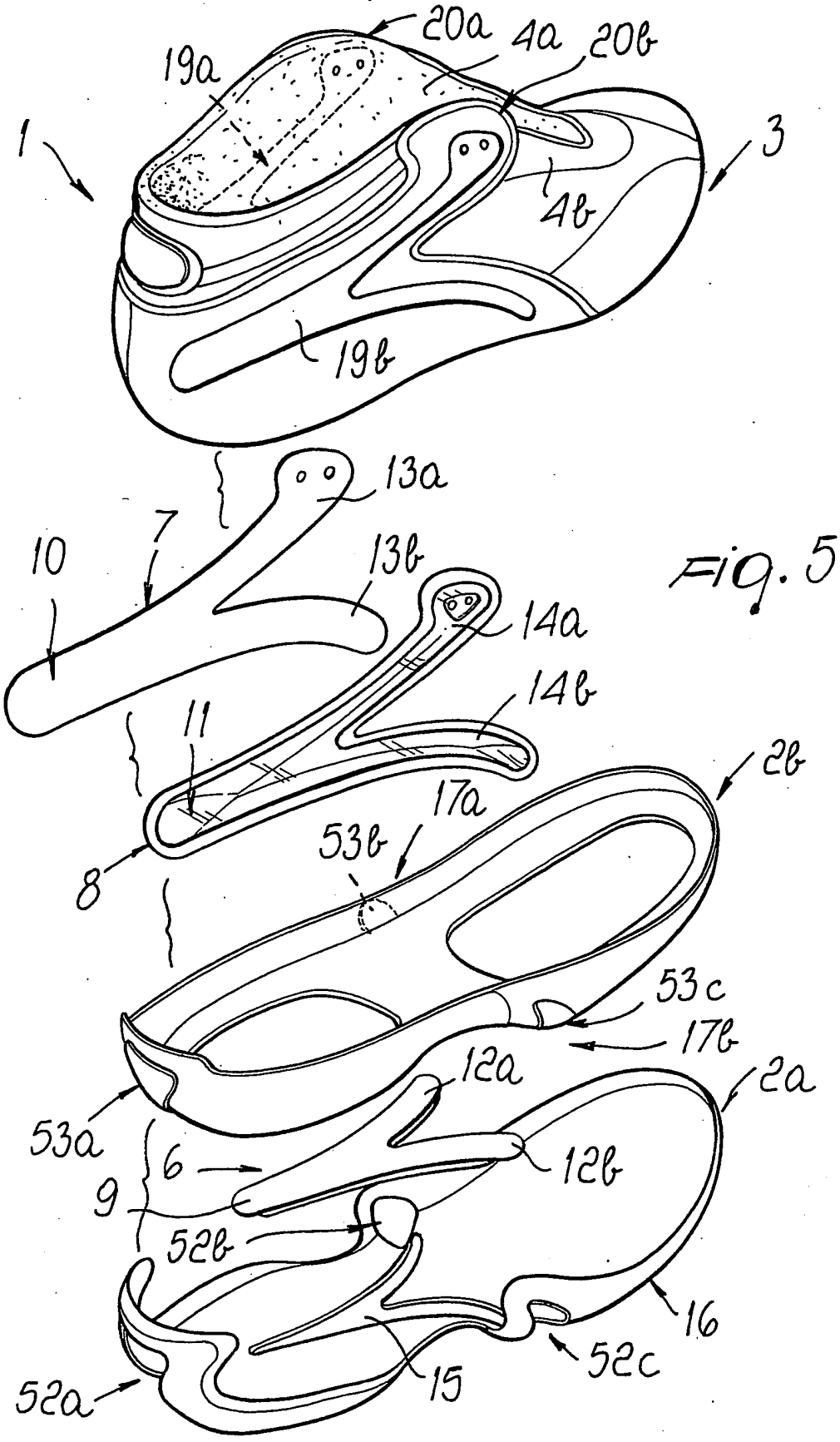
20a
4a
20b
19a
1
3
4b
19b
13a
10
7
13b
14a
14b
11
2b
17a
53b
8
53c
17b
12a
2a
53a
6
12b
9
52b
16
52c
15
52a

Fig. 5

INTERNATIONAL SEARCH REPORT

Inter ll Application No
PCT/ L1 01/08128

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A43B13/12 A43B23/02 A43B7/19 A43B7/20 A43B5/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A43B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	* elements 3 and heel counter * figures ---	2
X	US 4 989 350 A (BUNCH RICHARD P ET AL) 5 February 1991 (1991-02-05) * cf elements 71 and 34 * figure 1 ---	1,18-22
X	US 6 000 148 A (CRETINON FREDERIC) 14 December 1999 (1999-12-14) * cf lateral and medial elements plus element 20 * figures --- -/--	1

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

'A' document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search	Date of mailing of the international search report
20 December 2001	04/01/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Schölvinck, T.S.

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INTERNATIONAL SEARCH REPORT

Inter d Application No
PCT/EP 01/08128

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	PATENT ABSTRACTS OF JAPAN vol. 1998, no. 08, 30 June 1998 (1998-06-30) & JP 10 057110 A (MIZUNO CORP), 3 March 1998 (1998-03-03) abstract	1
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INTERNATIONAL SEARCH REPORT

Inte al Application No
PC[illegible] 01/08128

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